CLEMSON

IMPACTS

Camps teach youth about state's natural heritage

CLEMSON UNIVERSITY PUBLIC SERVICE ACTIVITIES - FALL 2010

"Everything about peaches"
Watermelon field day
New bug eats kudzu
Timber management

Vice President's Message

With the new fiscal year that began July 1, state funding for Clemson Public Service Activities (PSA) is roughly half (46%) the level of 2008. State funding is now the same dollar amount as 1985, not adjusted for inflation or population growth.

We are implementing strategic plans to focus all state resources on critical programs that support economic development for South Carolina's $34 billion agriculture and natural resources industries. In this issue you will find reports on research, Extension and regulatory programs directed at strengthening the rural economy and protecting natural resources.

Because of voluntary cooperation with Clemson's Livestock-Poultry Health veterinarians, South Carolina egg producers prevent salmonella contamination on their farms. Entomologists have discovered a new insect in South Carolina that eats kudzu but also eats soybeans. They are now working to track and contain the insect, called a bean plataspid.

Plant scientists and Extension agents working with South Carolina soybean growers saved the industry $25 million last year by preventing crop losses due to Asian soybean rust and reducing pesticide sprays. The monitoring system and earlier planting recommendations are now used as a national model for soybean producers.

The entire genetic material – or genome – of the peach has been sequenced by Clemson genetic scientists. This provides a model to identify and understand genes that are critical to the growth and development of deciduous trees and plants related to the peach, including apples, cherries, pears, raspberries, strawberries and roses.

A Carolina Clear workshop for contractors, engineers and landscape architects explained how to comply with stormwater management regulations through all phases of construction. With a focus on educating communities about the significance of South Carolina's water resources, Carolina Clear also conducts workshops for homeowners and summer camps for youth across the state.

A new research and demonstration project in Clemson's Experimental Forest will showcase how forests can be improved for wildlife while being managed for timber production. Another research project at the Baruch Institute near Georgetown is analyzing the effects of development on the coastal ecosystem, using fireflies as a sentinel species.

These reports represent some of the impacts that Clemson PSA is having across the state.

Sincerely,

John W. Kelly

John W. Kelly
Vice President for Public Service and Agriculture

more articles:
www.clemson.edu/public/impacts/

Front cover photo by Peter Hull

CLEMSON
PUBLIC SERVICE ACTIVITIES

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"Everything about peaches" is on YouTube

By Debbie Dalhouse

Everything you want to know about peaches is as close as YouTube, thanks to enterprising Clemson scientists. Desmond Layne, Clemson Extension tree fruit specialist, spearheaded the project to produce a website with videos, called "Everything About Peaches."

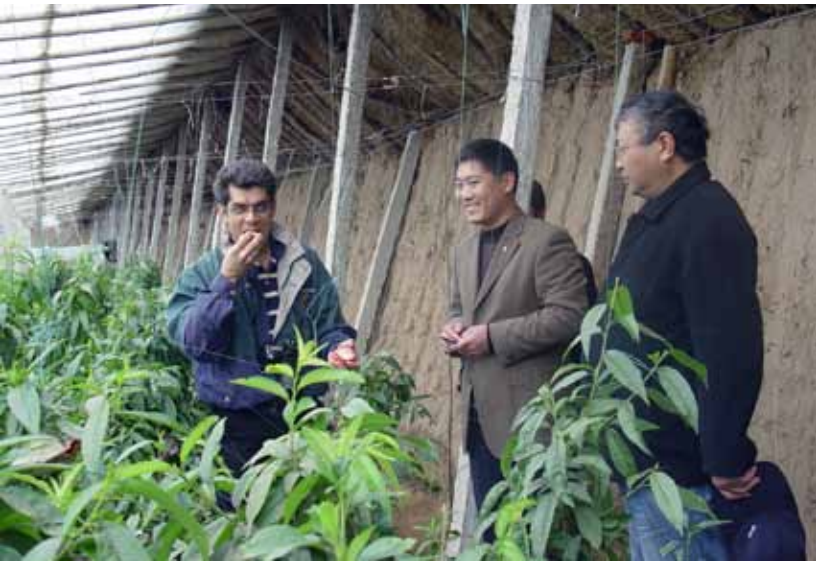


Photo by Desmond Layne

The videos have generated more than 4,000 hits on YouTube and feedback from across the globe. An unexpected result was a request by a consultant in Afghanistan who asked that the information be translated so the videos could be used to teach horticulture techniques to Afghani farmers.

The website also includes information on how growers in China are producing peaches in energy-conservation greenhouses and links to additional resources.

"The energy-efficient greenhouse production methods for growing peaches in China, if applied in the Southeast, could allow growers to bring high-quality fruit to market four to eight weeks early," Layne said. "This would be a tremendous advantage, especially for small- to medium-size farms that could serve local and regional markets."

For more information: Desmond Layne, 864-656-4961, dlayne@clemson.edu or www.clemson.edu/peach/.

Alternative energy research in Pee Dee region

By Peter Kent

Scientists are seeking new methods to produce flue-cured tobacco, a major cash crop in the Pee Dee region.

A grant from Philip Morris International will be used to hire a plant scientist and expand test facilities at the Pee Dee Research and Education Center in Florence, enabling research aimed at reducing grower costs.

"We will be looking at alternative energy sources — solar and alternative biofuels, such as switchgrass, which we grow experimentally," said Bruce Fortnum, director of the Pee Dee center and project leader.

The research will include variety trials and weed control, in addition to new methods to cure tobacco and conserve energy.

For more information: Bruce Fortnum, 843-662-3526 x 259, bfrtnm@clemson.edu.

Nutrients are at the root of success

By Peter Hull

Growers and members of the public sampled 25 seedless watermelon and 12 mini-watermelon varieties at the Edisto Research and Education Center's Watermelon Field Day on July 8.

A training session on nutrient transfer from the soil to roots by plant pathologist Christina Wells described how plants use nitrogen to make proteins, enzymes and DNA. They use phosphorous to make DNA, cell membranes and energy-transport molecules. Potassium activates enzymes and maintains water balance in plants.

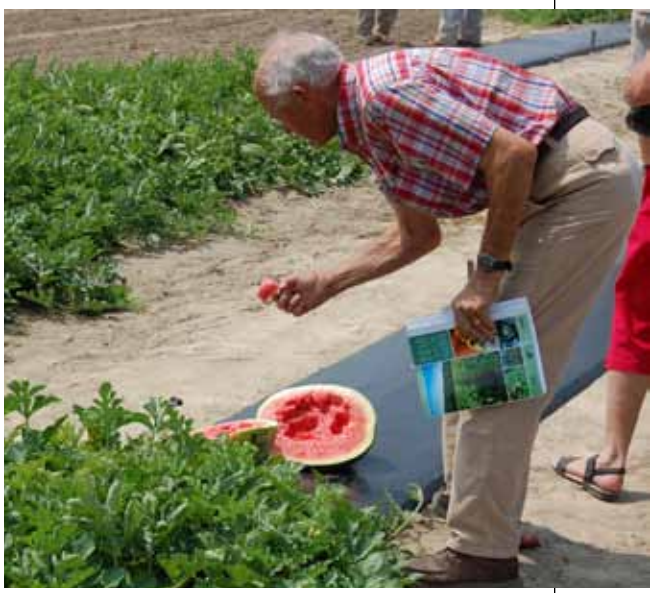


Photo by Peter Hull

"These are the building blocks of plants," Wells said.

Other presentations included a fungicide update and a demonstration of how soils hold water, as well as field research projects and variety trials. Field discussions included how to control insect pests, tools to measure soil water and a presentation on the Gravity Flow Drip Irrigation system. Certified Crop Advisor and Pesticide License credits also were offered.

For more information: Gilbert Miller, 803-284-3343, gmllr@clemson.edu or www.clemson.edu/edisto/.

New bug eats kudzu but it likes beans, too

By Peter Kent

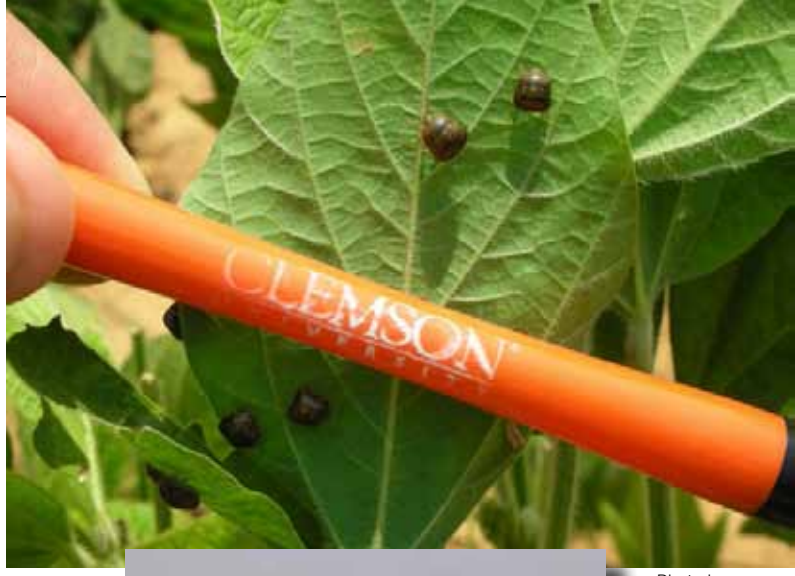


Photo by Jeremy Greene

An undocumented immigrant has been located in South Carolina and Georgia, according to entomologists. Getting into the United States last year — researchers are unsure how — a new invasive insect is flourishing in fields and houses.

Clemson researchers are asking for the public's help in tracking the bean plataspid, a relative of the stinkbug that is the first plataspid species reported in North America.

While the good news is that the bug feeds on kudzu, the significant concern is that it also feeds on bean plants, notably soybeans, which are a multimillion-dollar commodity crop in South Carolina. Approximately 590,000 acres of soybean are produced in South Carolina with a gross value of $139 million.

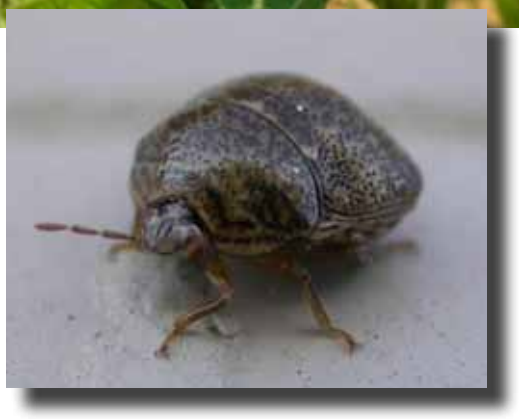


Photo by U. of Georgia

"The bean plataspid has been confirmed on kudzu and/or soybeans in 13 counties in South Carolina," said Jeremy Greene, Extension entomology specialist at the Edisto Research and Education Center in Blackville.

"We are actively looking for this insect, and the S.C. Soybean Board has funded a portion of a project to help with the search for this pest," said Greene. "If you see it in or around kudzu, in noticeable numbers on buildings, or anywhere, please let me know quickly."

For more information: Jeremy Greene, 803-284-3343 x 245, greene4@clemson.edu.

Farm Field Day showcases Pee Dee agriculture

By Peter Hull

More than 200 growers visited the Pee Dee Research and Education Center near Florence on August 10 for the annual Farm Field Day agricultural showcase.

The annual event is open to the public and featured tours of research projects, including Clemson's long leaf pine restoration program, switchgrass use as a biofuel, muscadine grapes, soybean and cotton breeding, cotton insect management, peanut varieties and tobacco insect control.

Palmetto State farmers stand to benefit from an expected surge in demand for alternative fuels, particularly ethanol produced from switchgrass, a native perennial plant that is drought-tolerant and requires little care.

Afternoon speakers were S.C. Commissioner of Agriculture Hugh Weathers; David Winkles, president of the S.C. Farm Bureau; and Charlotte Krugler, emergency preparedness veterinarian with Clemson University Livestock-Poultry Health. In addition, U.S. Department of Agriculture soil scientist Ariel Szogi provided Certified Crop Advisor training for soil nutrient management.

Photo by Peter Hull

The 2,300-acre center conducts research and extension programs on field crops of the Pee Dee region, as well as turfgrass and agroecology.

For more information: 843-662-3526 or www.clemson.edu/peedeerec/.

Monitoring for soybean rust saves $25 million

By Peter Hull

Monitoring systems and reduced pesticide sprays save South Carolina soybean growers more than $25 million a year, with about $10 million saved in reduced crop losses and about $15 million in reduced spraying costs.

Soybean rust is a disease that causes severe yield losses through premature leaf-drop and decreased seed weight.

In 2009, South Carolina growers produced more than 14 million bushels on 590,000 acres with a gross value of nearly $140 million. Less than 1 percent of the crop was lost to rust.

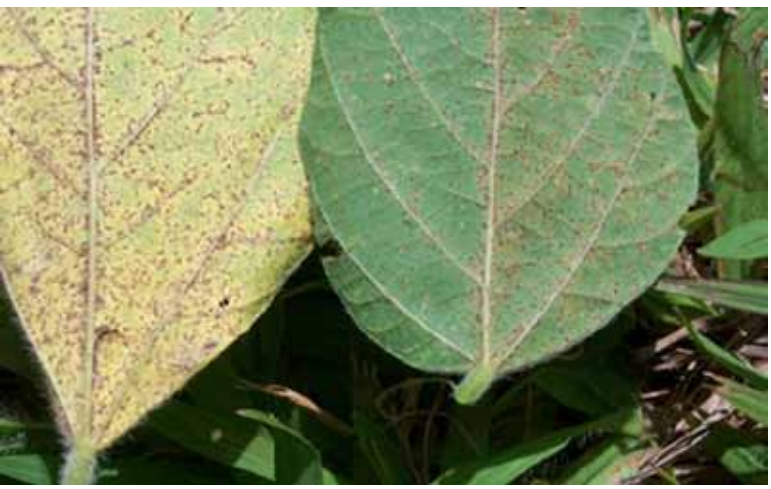
John Mueller, Clemson soybean pathologist at the Edisto Research and Education Center, leads the monitoring program with Extension agents, regulatory agents and growers in 16 South Carolina counties.

To reduce the threat of rust affecting crops, Mueller recommends that growers plant earlier — April instead of June — so most soybeans will be harvested before rust arrives, typically in August or September. He also suggests spraying only in areas where rust is found by monitoring.

"With every day that goes by 'rust-free,' the odds of rust damage to our early planted soybeans becomes less and less," Mueller said.

The monitoring project is a model for the nation and is funded by the U.S Department of Agriculture, United Soybean Board, S.C. Soybean Board and the North Central Soybean Research Council.

For more information: John Mueller, 803-284-3343 x 223, jmllr@clemson.edu.



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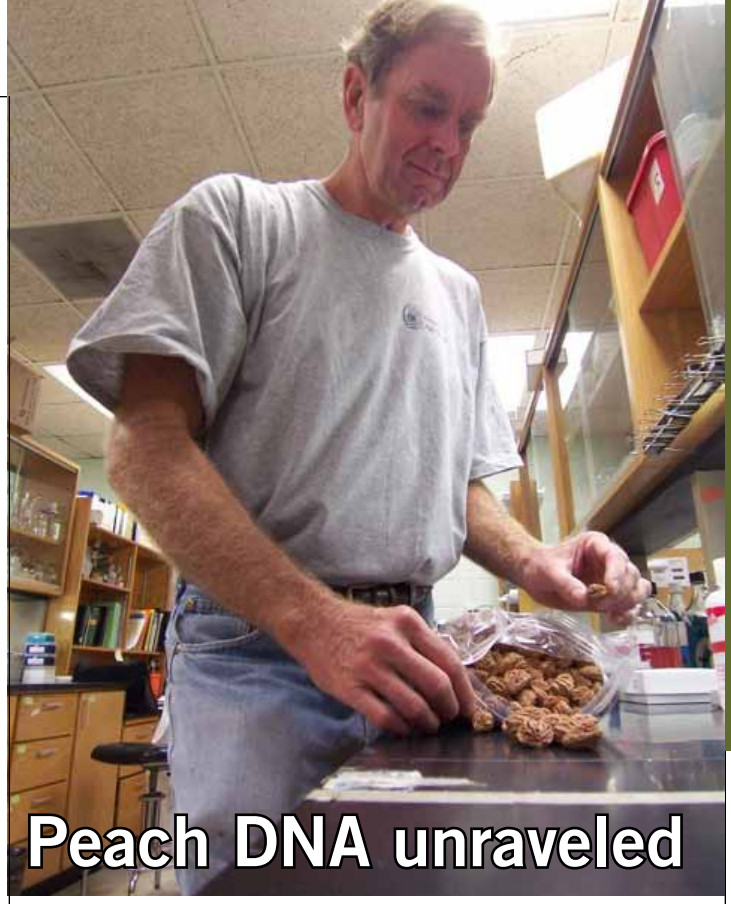

Peach DNA unraveled

Photo by Peter Kent

By Peter Kent

A peach tree at the Musser Fruit Research Farm has had its entire DNA sequenced, enabling further research to identify beneficial traits to grow better trees and fruit.

This genome sequence is the culmination of an extensive research program pioneered at Clemson under the leadership of Bert Abbott, who holds the Robert and Lois Coker Trustees Chair in Molecular Genetics. The research goal is to establish the peach as a model for identifying and understanding genes that are critical for deciduous tree growth and development.

"The tree providing the DNA for the sequencing effort was chosen after careful analysis of DNA from specific trees in the Musser orchard," said Abbott. "The choice of this tree was crucial to the overall success of the project, and the extremely high quality of the peach genome sequence assembly is a direct result of this choice."

The Clemson research gained international attention when the Joint Genome Institute, a federally funded sequencing facility, identified sequencing the genome of peach as one of the key plant species of interest worldwide.

The tree's DNA sequence has opened a new era in fruit-tree research that could have far-reaching implications for the future of peaches and many other related plants, including apples, cherries, pears, raspberries, strawberries and roses.

For more information: Bert Abbott, 864-656-3060, aalbert@clemson.edu or www.peachgenome.org.

Stormwater compliance workshop held in the Pee Dee

By Peter Hull

Photo by Peter Hull

Navigating the maze of construction and post-construction stormwater compliance can be difficult.

Carolina Clear and the Florence/Darlington Stormwater Consortium hosted a summer workshop that addressed stormwater management issues through all phases of construction.

The workshop, tailored to contractors, subcontractors, registered landscape architects, professional engineers and Tier B surveyors, included presentations on permit requirements, best management practices and a question and answer session with a representative from the S.C. Department of Health and Environmental Control.

"Clemson University has been involved with water quality issues for more than 50 years through teaching, research and extension," said Cal Sawyer, associate director of Clemson's Center for Watershed Excellence.

"This experience working with a broad cross-section of groups, from engineers and developers to local governments and the general public, provides Clemson with a sound foundation to work with people in the Pee Dee," Sawyer said.

For more information: www.clemson.edu/public/carolinaclear/.

Carolina Clear sponsors programs across the state

By Peter Hull

South Carolinians are becoming more aware of the effects of their homes and yards on nearby water bodies. Carolina Clear, Clemson's stormwater education and awareness program, teaches homeowners, youth, builders and government officials about responsible water management.

Recent rain garden workshops were held in Pickens and Georgetown counties, and included instruction on local water quality, stormwater management and the principles of rain garden design.

Correctly constructed rain gardens allow stormwater runoff to slowly infiltrate the groundwater table. Rain gardens absorb excess nitrogen and phosphorous in stormwater and trap sediment while biological processes filter out other pollutants.

Rain barrel workshops, held in Columbia, Sumter and Hartsville, provided information on water pollution, water harvesting, and rain barrel function, design and construction. Each participant built a rain barrel to take home. More workshops are planned in the fall.

Photo by Peter Hull

Rain barrels reuse rainwater to irrigate gardens and lawns, water plants and wash cars. They benefit the environment by reducing stormwater flow, which causes erosion and can carry pollutants from yards and streets into streams. A 1,000-square-foot roof catches more than 600 gallons of water from just an inch of rainfall.

For more information: Katie Giacalone, 843-554-7226 x 115, kgiacal@clemson.edu or www.clemson.edu/carolinaclear/.

Researchers launch firefly watch program

By Alex Chow

Fireflies – an icon of South Carolina summers – are fewer and harder to find in some communities along the coast lately because of urban development and changes in forestry practices.

A field survey in May was conducted at Hobcaw Barony near Georgetown by entomologist Juang-Horng Chong and biosystems engineer Alex Chow. They enlisted the help of citizen scientists – including students from Georgetown High School and Waccamaw High School – to study the impacts of human activities and environmental factors on the abundance and distribution of fireflies.

The firefly watch program included an orientation, a daytime field survey and a nighttime field survey. The orientation included firefly biology, methods for firefly counting and identification, methods for soil and litter sampling, safety in the field, and environmental impacts from coastal developments. In the daytime field survey, volunteers visited the field survey sites to collect soil and litter samples. They returned at night to identify and count the fireflies.

Photo by Caroline Chan

Clemson scientists will analyze the data collected for potential relationships between land use patterns, soil and litter quality, and firefly abundance. The long-term project will be recruiting volunteers again next spring.

For more information: Alex Chow, 843-546-1013 x 232, achow@clemson.edu.

Environmental education program reaches statewide

By Donna Bowen

Last year, Master Naturalist volunteers provided 4,500 hours of service removing invasive species such as beach vitex, monitoring water quality, and assisting state park rangers.

Directed by ethnobotanist Karen Hall, the Master Naturalist program trains and coordinates a statewide corps of volunteers who provide education and service to support natural resources management.

"The Master Naturalist program does a great job providing opportunities for environmental education because they teach individuals who teach others," said Jody Childs, Environmental Education Association of South Carolina awards director. "It's a multiplying effect to increase environmental literacy across the state."

Photo by Karen Hall

Because of this, the Environmental Education Association selected the Master Naturalist program to win the 2010 award for outstanding leadership in environmental education.

For more information: Karen Hall, carlson@clemson.edu, or www.clemson.edu/public/naturalist/.

New timber and wildlife management programs

By Peter Kent

A new research and demonstration project is planned in Clemson's Experimental Forest to showcase how forests can be improved for wildlife and also managed for timber products.

"The project will serve as a model for private landowners across the Southeast," said Greg Yarrow, wildlife ecology professor. "It will provide an excellent teaching laboratory for our students as well as provide new information and innovative approaches to integrate wildlife habitat improvement practices into timber management programs."

With more than 75 percent of the state's natural resources on private lands, Clemson provides research-based information to help landowners, foresters and natural-resource professionals manage forest for timber products and wildlife habitat.

This research is funded by a grant from the Sustainable Forestry Initiative Inc. 2010 Conservation and Community Partnerships Grant Program.

For more information: Greg Yarrow, 864-656-7370, gyarrow@clemson.edu.

Photo by Greg Yarrow

Camps teach youth about state's natural heritage

By Peter Hull

More than 120 children from across the state learned about protecting the state's water resources during camps this spring and summer in the Lowcountry, Midlands and Upstate.

At Camp Sewee in Awendaw, youth age 8 to 14 learned about the state's natural heritage and the role rivers play. Hosted by Clemson's Youth Learning Institute and sponsored by Carolina Clear, the camp included a trawl of marine life in Charleston Harbor, as well as lessons on tidal creeks, Carolina bays, estuaries and the importance of the state's barrier islands.

In Lexington County, 10- to 12-year-olds learned the history of Lake Murray, the role of watersheds and about aquatic insects in a 4-H2O Pontoon Classroom led by Bill Blackston, coordinator for the Lexington Countywide Stormwater Consortium.

At Harbison State Forest in Columbia, 12- to 14-year-olds studied the forestry aspects of wetlands and learned about the cold-water stream below Lake Murray's dam and the flood plains of the Congaree National Park in an advanced 4-H2O camp directed by Mary Nevins, coordinator for the Richland Countywide Stormwater Consortium.

Photo by Peter Hull

On Lake Keowee, 8- to 12-year-olds in a 4-H2O camp collected water samples, observed microscopic and macroscopic life, conducted water quality experiments, and learned about enhancing and preserving aquatic ecosystems. Another camp was held for 9- to 12-year-olds at Piedmont Forestry Center where they completed a stream assessment and collected stonefly and dragonfly nymphs. Marguerite Porter, coordinator of the Pickens Countywide Stormwater Consortium, led both camps.

"Thanks to the many partnerships that make these camps possible, children across South Carolina can learn about the state's natural resources, and hopefully become environmental stewards," said Katie Giacalone, Carolina Clear's statewide coordinator.

For more information: Carolina Clear www.clemson.edu/carolinaclear/, Youth Learning Institute www.clemson.edu/yli/.

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S.C. egg producers prevent salmonella

By Peter Kent

The salmonella outbreak this summer, caused by contaminated eggs from Iowa farms, brought to light a key difference with South Carolina producers.

For the past 12 years, South Carolina commercial egg producers have participated in voluntary salmonella control programs to prevent the disease in laying hens. Part of this program includes testing egg farms for salmonella at Clemson Livestock Poultry Health. More than 500 samples are tested each year.

"The U.S. Food and Drug Administration did not require these measures prior to July 9," said Boyd Parr, state veterinarian and director of Livestock Poultry Health. "Our egg producers asked Clemson to help develop and monitor a program to ensure South Carolina laying hens and their eggs remain free of Salmonella enteritidis."

As a result of the voluntary effort, no South Carolina produced eggs were involved in the recent recall, said Julie Helm, Clemson poultry veterinarian. Livestock Poultry Health programs include animal disease detection and prevention, meat and poultry inspection and a diagnostic laboratory that assists veterinarians and livestock and poultry producers across the state.

For more information: www.clemson.edu/LPH/ .

Photo by Rebecca Dalhouse